ONTARIO MINISTRY OF ENVIRONMENT
36936000023759

OPERATING SUMMARY

1972

LIBRARY COPY
JUN 15 1973
MINISTRY OF THE
ENVIRONMENT

BURLINGTON-DRURY LANE

D
57
56
374
972
E

TD
367
.A56
B874
1972

Burlington ~ Drury Lane : water pollution control plant.

81583

Ontario

Ministry of the
Environment

135 St. Clair Avenue West
Toronto 195, Ontario

We are pleased to present you with the 1972 operating summary for the water pollution control plant serving your community.

This summary contains data on the performance of the plant as well as relevant financial information. Of particular interest is the review of the year's activities in which significant items of these data are discussed in some detail by the operations engineer and his staff who, by their day-to-day involvement with the operation, are thoroughly familiar with the plant.

We appreciate your continuing interest in protecting the environment through the efficient operation of this wastewater treatment facility.

D.S. Caverly,
Assistant Deputy Minister.

D.A. McTavish, P. Eng.,
Director,
Project Operations Branch.

Digitized by the Internet Archive
in 2015

https://archive.org/details/burlingtondruryl23759

MINISTRY OF THE ENVIRONMENT

MINISTER
Honourable James A.C. Auld

DEPUTY MINISTER
E. Biggs

ASSISTANT DEPUTY MINISTER
D.S. Caverly

EXECUTIVE DIRECTOR
K.H. Sharpe

PROJECT OPERATIONS BRANCH

DIRECTOR
D.A. McTavish

ASSISTANT DIRECTOR
C.W. Perry

REGIONAL SUPERVISOR
P.J. Osmond

OPERATIONS ENGINEER
A. Clark

135 St. Clair Avenue West
Toronto 195

BURLINGTON-DRURY LANE
WATER POLLUTION CONTROL PLANT

operated for

THE TOWN OF BURLINGTON

by the

MINISTRY OF THE ENVIRONMENT

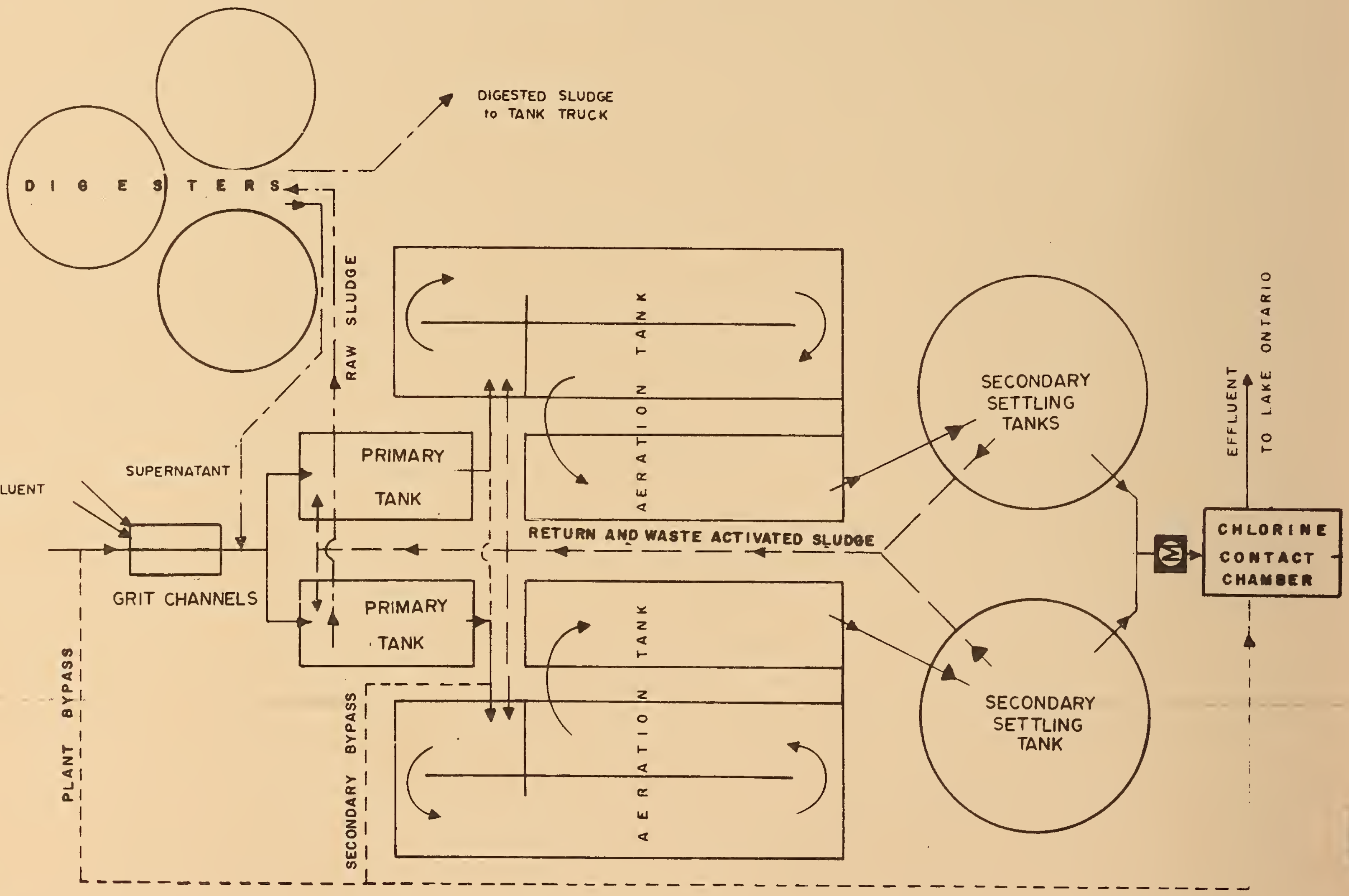
1972 ANNUAL OPERATING SUMMARY

[illegible]

CONTENTS

Title Page 1
Flow Diagram 4
Design Data 5
'72 Review 6
Project Costs 8
Process Data 11

BURLINGTON DRURY LANE
WATER POLLUTION CONTROL PLANT



DESIGN DATA

PROJECT NO.		2-0051-60
TREATMENT		Activated Sludge
DESIGN FLOW		2.5 mgd
DESIGN POPULATION		30,000
BOD	- Raw Sewage	200 mg/l
	- Removal	90%
SS	- Raw Sewage	180 mg/l
	- Removal	90%

PRIMARY TREATMENT

Screening

1" bar screens

Grit Removal

Type: Grit channels
Retention: 0.8 min

Primary Sedimentation

Type: Walker Process
Size: Two 49.3' x 18' x 12.25'
(135,700 gal)
Retention: 1.3 hr
Loading: Surface, 1400 gal/ft^2/day
Weir, 17,100 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Diffused air; triple-pass
Size: Two tanks, each with
2 passes 118' x 18' x 10.7'
1 pass 85.5' x 18' x 10.7'
(833,000 gal. total)
Retention: 8.0 hours

Air Supply

One Sutorbilt - 1500 cfm
Two Roots-Connerville - 750 cfm

Diffusers - (each tank)

1) 132 Schumacher Brandel tubes in first two passes

2) 41 Spargers on 2' centres in third pass

Secondary Sedimentation

Type: Rex Unitube Tow-Bro
Size: Two 50' dia x 10.6' swd
(260,000 gal)
Retention: 2.5 hr
Loading: Surface, 1000 gal/ft^2/day
Weir, 8500 gal/ft/day

CHLORINATION

Type: Kent

Chlorine Contact Chamber

- in outfall

OUTFALL

- to Lake Ontario

SLUDGE HANDLING

Digestion System

Type: Two-stage

Primary --
Size: Two 40' dia tanks (313,000 gal total)
Loading: 2.7 lb/ft^3/mo

Secondary --
Size: One 40' dia tank (143,000 gal)
Loading Total: 1.9 lb/ft^3/mo

'72 Review

GENERAL

The Burlington Drury Lane project consists of a 2.5 mgd secondary water pollution control plant utilizing the conventional form of the activated sludge treatment process. Plant effluent is discharged to Lake Ontario. Sludge is digested anaerobically and removed by tank truck for land disposal. This plant is one of the three Ministry of the Environment operated treatment facilities in the Town of Burlington. Municipal forces operate the sewage collection system, including 15 pumping stations, three of which are Ministry financed. The cost of operating the collection system and pumping stations is not reflected in the costs shown in the body of this report.

EXPENDITURES

The 1972 operating costs were $37, 791.61 down from $43, 733.37 in 1971. The change was due primarily to changing the portion of the total Burlington projects salary cost allocated to this project from 30 to 25 percent. The unit cost of operation was $52 per million gallons treated, as compared to $75 in 1971.

PLANT FLOWS AND CHLORINATION

Plant flows during the period June through to September have been estimated as the flow metering equipment was out of service for repairs during this period. The average daily flow during the remainder of the year was 2.0 million gallons per day as compared with 1.6 million gallons per day in 1971. The total flow for the year, based on the above daily average was 730 million gallons, an increase of 25% from 1971 flows. The maximum day flow during every month of the year in which flows were recorded exceeded the plant design capacity. It is noteworthy that this did not happen even once during the previous year.

Chlorination is practiced during the period May 15 to October 15. An average chlorine dosage of 2.20 mg/l was required to maintain a 15 minute chlorine residual of 0.5 mg/l in the treated effluent.

PLANT EFFICIENCY

The average raw sewage strength was 166 mg/l BOD and 192 mg/l suspended solids, both lower than the 1971 values of 209 mg/l BOD and 249 mg/l suspended solids. In terms of weight, the 1972 loading averaged 3320 lbs. of BOD and 2830 lbs. of suspended solids per day as compared to 3340 lbs. of BOD and 3980 lbs. of suspended solids per day in 1971. It appears from the above data that the total organic loading during 1972 was relatively unchanged from the previous year but that the hydraulic loading increased approximately 25% over 1971.

The average removal efficiency during 1972 was 91 percent for BOD and 94 percent for suspended solids, relatively unchanged from the previous year. The effluent quality averaged 15 mg/l BOD and 12 mg/l suspended solids, both within Ministry of the Environment objectives.

Phosphorus concentrations in the raw sewage averaged 8.6 mg/l during 1972 down from 11.0 mg/l in 1971 and 4.7 mg/l in the plant effluent as compared to 6.0 mg/l in the previous year. These figures indicate that the total phosphorus load and the total phosphorus remaining in the plant effluent, in terms of pounds per day was relatively unchanged from 1971. Approximately 14 tons of phosphorus was removed from the sewage during 1972 but a further 17 tons was discharged into Lake Ontario during the year.

SLUDGE DIGESTION AND DISPOSAL

A total volume of 2.33 million gallons of raw sludge was pumped to the digester, an increase of 37 percent over 1971. The average raw sludge total solids concentration was 7.4%, down slightly from 1971. The total volume of liquid digested sludge hauled from the plant was 5730 cubic yards.

CONCLUSIONS

In general the plant operated satisfactorily during the year and the effluent quality was similar to 1971 and within Ministry of the Environment objectives.

Plant organic loadings and removal efficiencies were similar to previous years. However the plant hydraulic loading increased 25% over 1971 indicating that the increase was primarily in the nature of ground water or storm water.

The plant operated at an average of 80% of design flow capacity as compared with 64% during 1971.

PROJECT COSTS

NET CAPITAL COST	$676,033.78
DEDUCT - Portion financed by CMHC/MDLB	
Municipal Advances	(41,721.91)
Long Term Debt to MOE	$634,311.87
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1972	$354,272.39

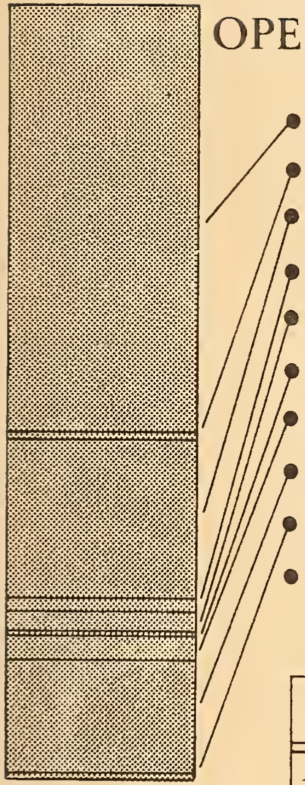
Net Operating	$ 36,426.35
Debt Retirement	9,479.00
Reserve	2,184.94
Interest Charged	35,571.55
TOTAL	$ 83,661.84

RESERVE ACCOUNT

Balance @ January 1, 1972	$ 45,902.83
Deposited by Municipality	2,184.94
Interest Earned	2,997.87
	$ 51,085.64
Less Expenditures	2,242.80
Balance @ December 31, 1972	$ 48,842.84

1972 COSTS

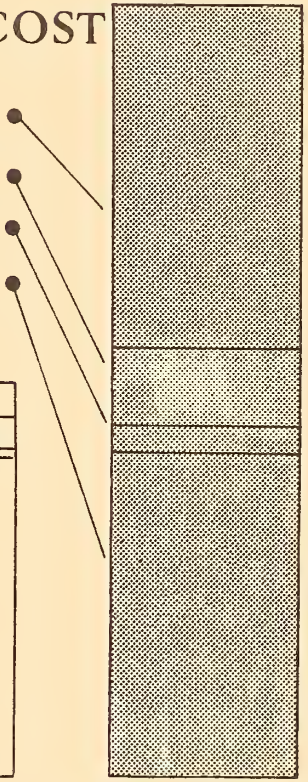
OPERATING COSTS



PAYROLL	56 %
FUEL	< 1 %
POWER	22 %
CHEMICALS	2 %
GENERAL SUPPLIES	3 %
EQUIPMENT	< 1 %
REPAIRS & MAINTENANCE	3 %
SUNDRY	13 %
WATER	< 1 %
TRAVEL	NIL %

TOTAL ANNUAL COST

NET OPERATING	44 %
DEBT RETIREMENT	11 %
RESERVE	3 %
INTEREST	42 %



YEARLY OPERATING COSTS

YEAR	SEWAGE TREATED in million gallons	TOTAL OPERATING COSTS	TREATMENT COSTS $ per million gal	TREATMENT COSTS ¢ per lb BOD
1968	568.20	42,055.65	74.02	3 cents
1969	594.90*	42,152.71	70.86	4 cents
1970	-	38.417.86	-	-
1971	584.0	43,733.37	74.90	3 cents
1972	732. *	37,791.61	51.60	3 cents

* Estimate

MONTHLY OPERATING COSTS

MONTH	TOTAL EXPENDITURE	REGULAR PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and MAINTENANCE	SUNDRY*	WATER	TRAVEL
JAN	2071.79	1921.12		88.93						61.74		
FEB	2820.81	1988.58		(301.71)	583.20		15.59	158.31	84.94	272.19	19.71	
MAR	3096.18	1827.88		127.96	606.29		25.68			479.35	29.02	
APR	2908.05	1940.79			633.36		34.52		245.20	32.19	21.99	
MAY	3160.29	1830.09		67.74	689.56		4.65			547.59	20.66	
JUNE	4006.87	2681.06		70.98	609.06	61.52	486.48		58.91	16.49	22.37	
JULY	1349.86				694.55	177.00	90.85		145.01	221.22	21.23	
AUG	2933.93	1800.93			703.35	177.00	(5.60)		233.57	(2.06)	26.74	
SEPT	1510.26				794.07	(17.70)	103.40			599.00	31.49	
OCT	897.96	(38.94)			666.27	177.00			44.31	28.66	20.66	
NOV	4072.25	1811.72	(107.19)		847.04		40.36		101.52	1357.31	21.49	
DEC	2907.82	(490.72)		69.60	1562.81	177.00	213.35		74.56	1270.29	30.93	
TOTAL	31736.07**	*** 15272.51	(107.19)	123.50	8389.56	751.82	1009.28	158.31	988.02	4883.97	266.29	

Brackets indicate credit.

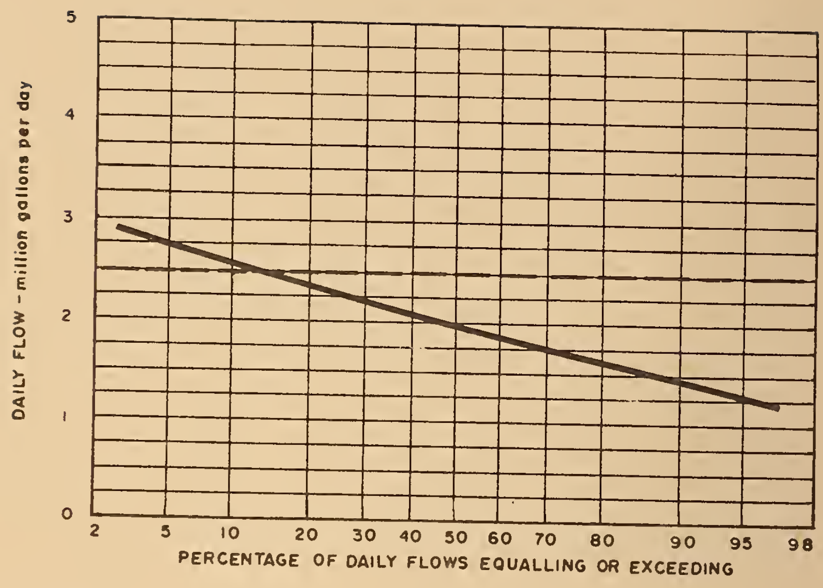
* Sundry includes sludge haulage costs of $3,178.63

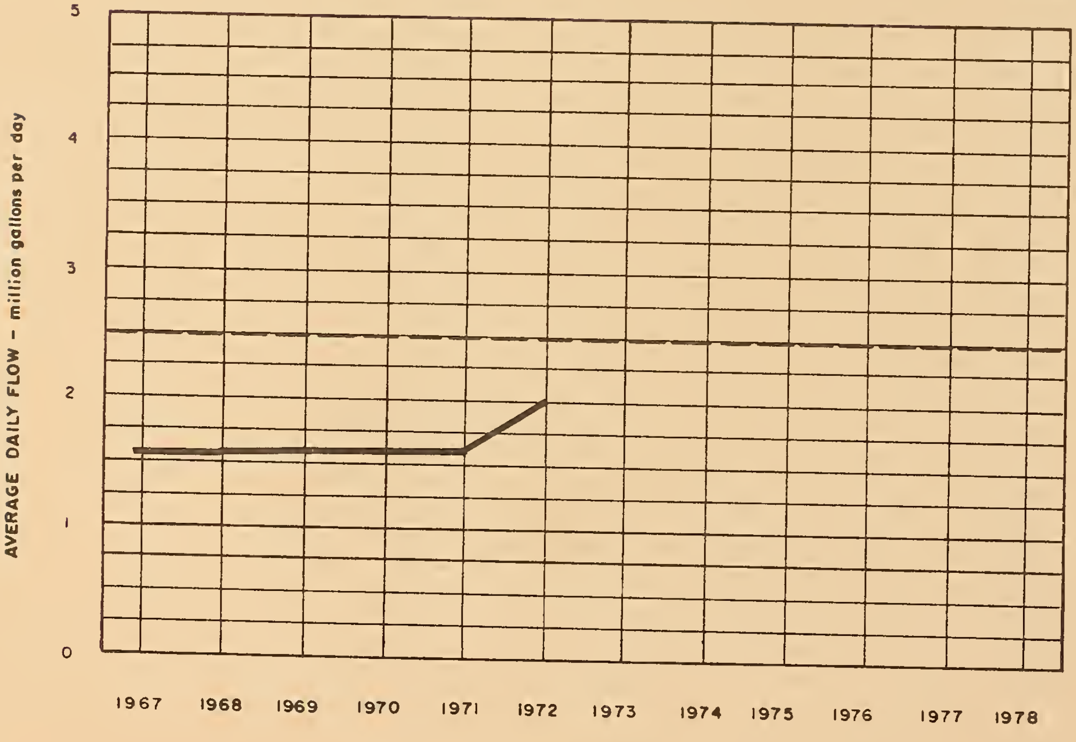
** Corrected March 73 to $37,791.61

*** Corrected March 73 to $21,328.05

PROCESS DATA

FLOWS



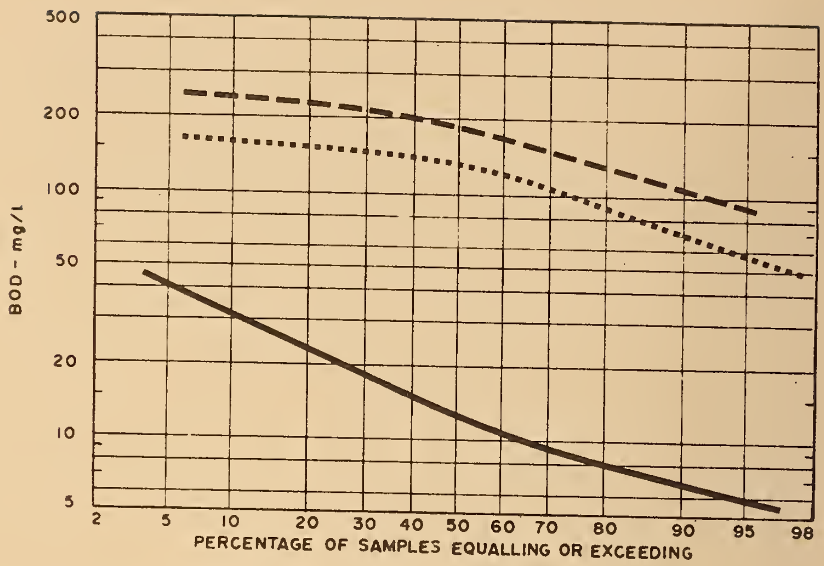


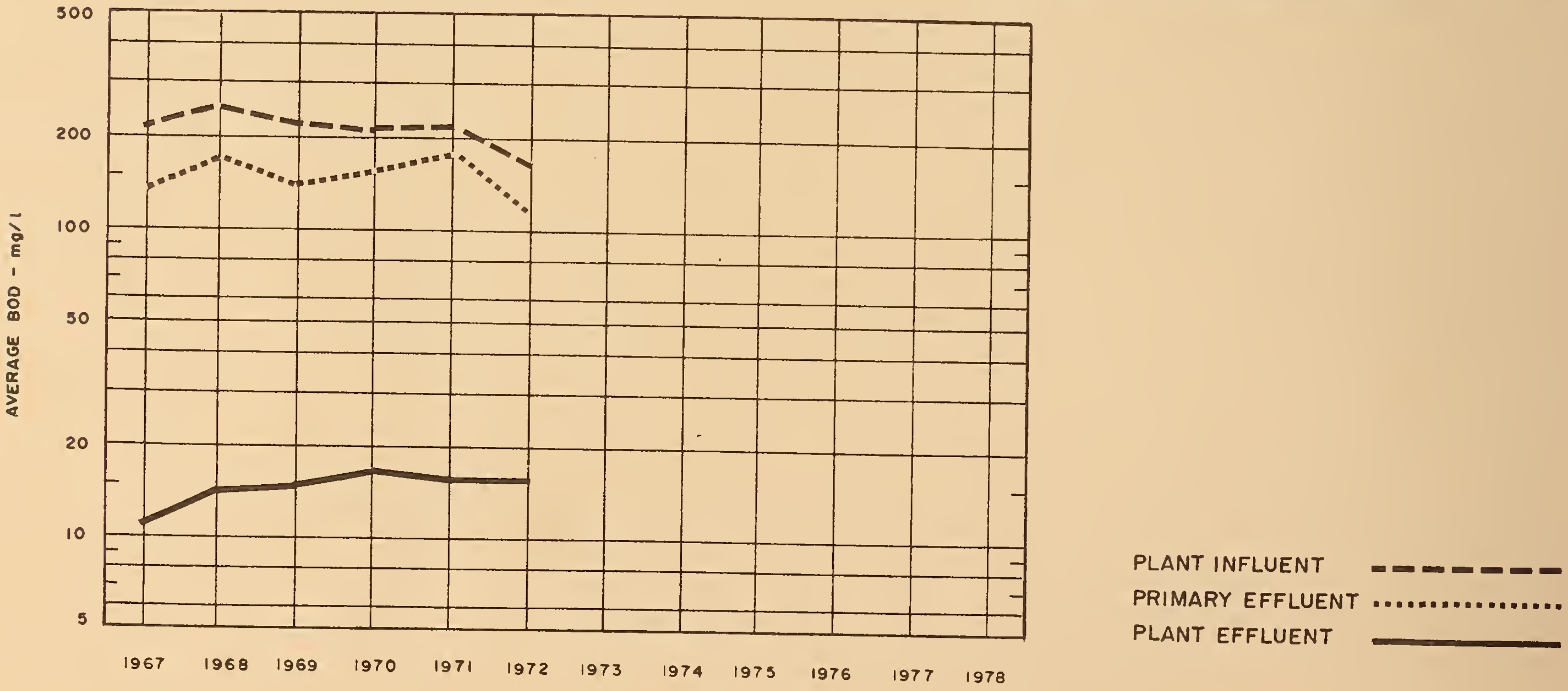
DESIGN CAPACITY – – – – – – – –

PLANT PERFORMANCE

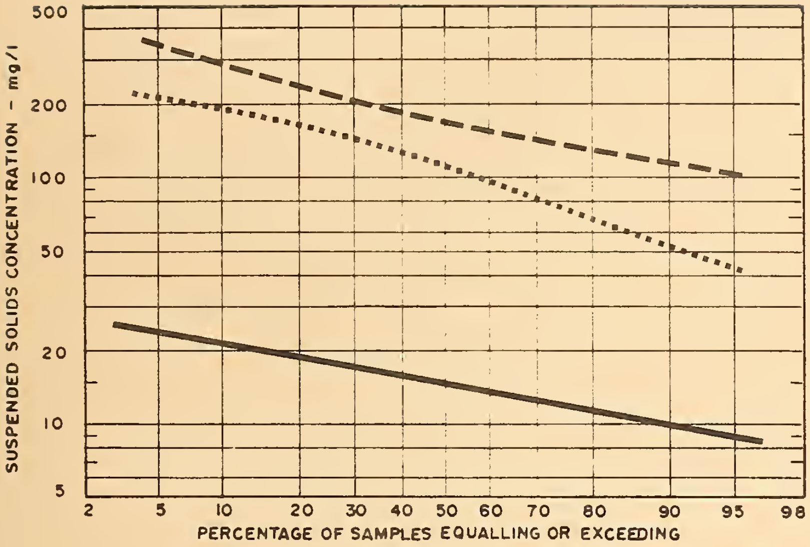
MONTH	FLOWS			BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				PHOSPHORUS	
	TOTAL FLOW	AVERAGE DAY	MAXIMUM DAY	INFLUENT	EFFLUENT	REDUCTION		INFLUENT	EFFLUENT	REDUCTION		INFLUENT	EFFLUENT
	million gallons	mil. gal	mgd	mg/l	mg/l	%	10^3 pounds	mg/l	mg/l	%	10^3 pounds	mg/l P	mg/l P
JAN	60.0	1.9	3.6	115	25	80	55	125	5	96	72	7.3	4.7
FEB	48.3	1.7	2.2	220	34	85	90	353	11	97	165	13.0	8.5
MAR	69.2	2.1	2.8	170	13	92	101	188	13	93	112	8.3	7.2
APR	63.2	2.1	3.1	120	8	93	72	176	13	93	104	6.7	5.9
MAY	59.3	1.9	2.9	140	9	94	78	140	13	91	75	5.0	3.5
JUNE	-	-	-	200	5	98	-	198	9	95	-	9.5	6.3
JULY	-	-	-	180	6	97	-	160	15	91	-	10.0	5.0
AUG	-	-	-	110	6	94	-	140	10	93	-	5.5	2.3
SEPT	-	-	-	200	10	95	-	200	15	93	-	12.0	6.0
OCT	57.5	1.9	2.7	200	13	94	107	207	18	91	109	11.0	2.5
NOV	68.3	2.3	3.2	200	18	91	124	146	10	93	93	8.8	1.1
DEC	68.2	2.2	3.5	190	18	91	117	150	20	87	89	7.5	2.9
TOTAL	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG.	-	2.0	MAXIMUM 3.6	166	15	91	93	192	12	94	102	8.6	4.7
No. of Samples	-	-	-	13	13	-	-	34	31	-	-	13	13

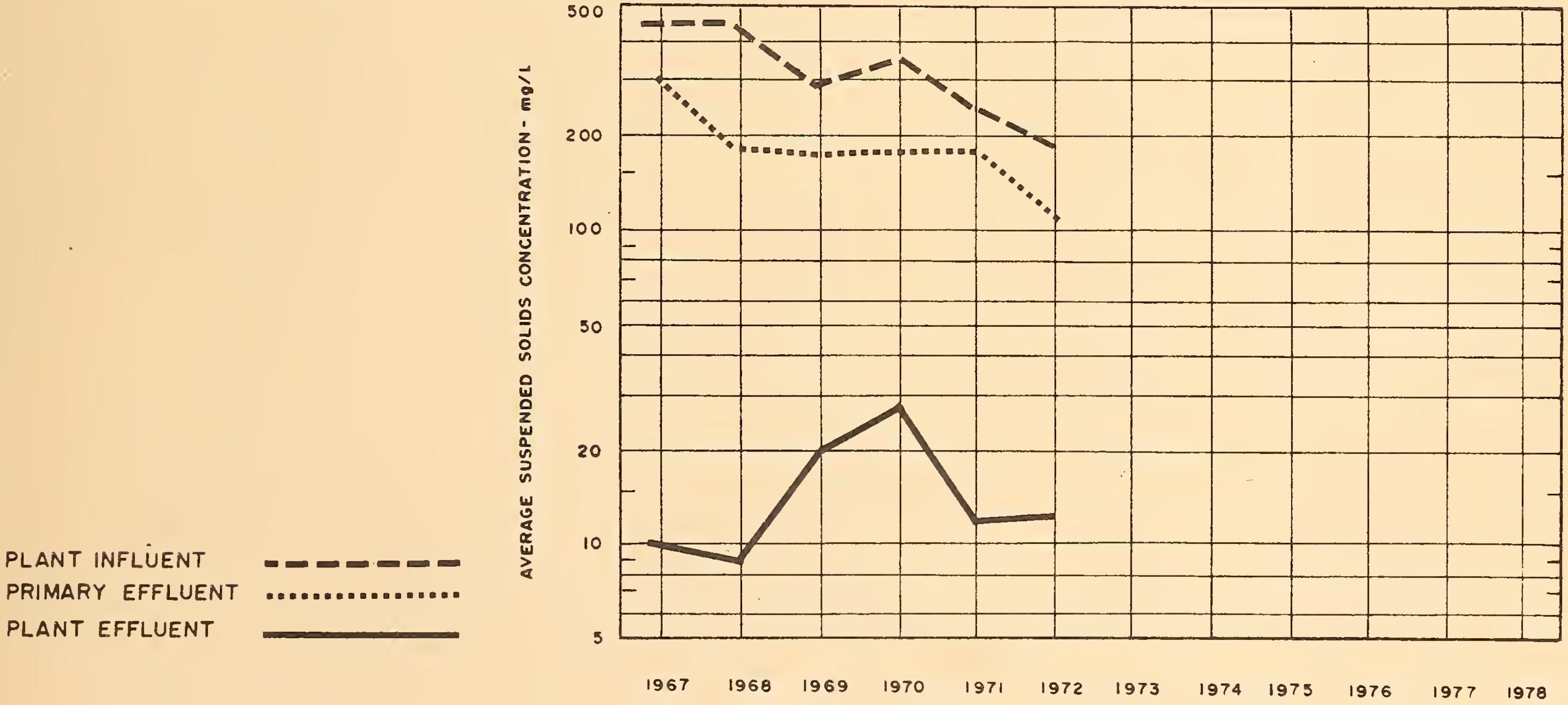
BIOCHEMICAL OXYGEN DEMAND



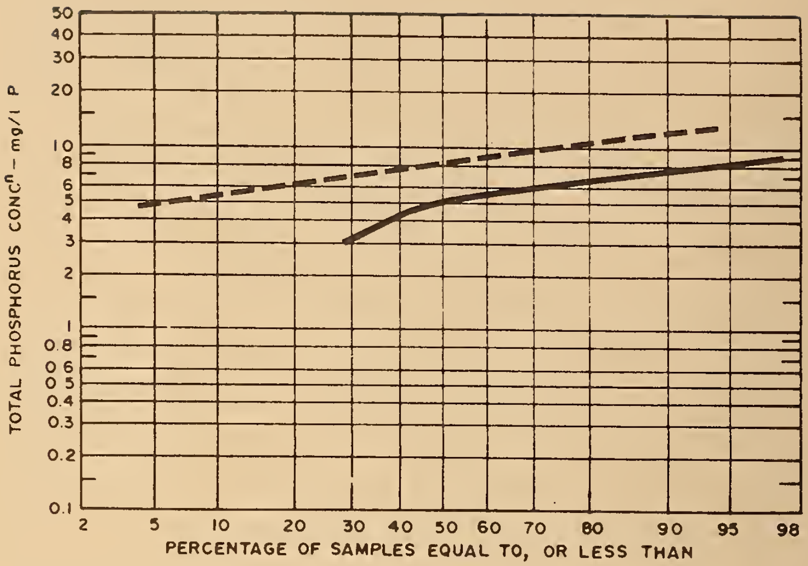


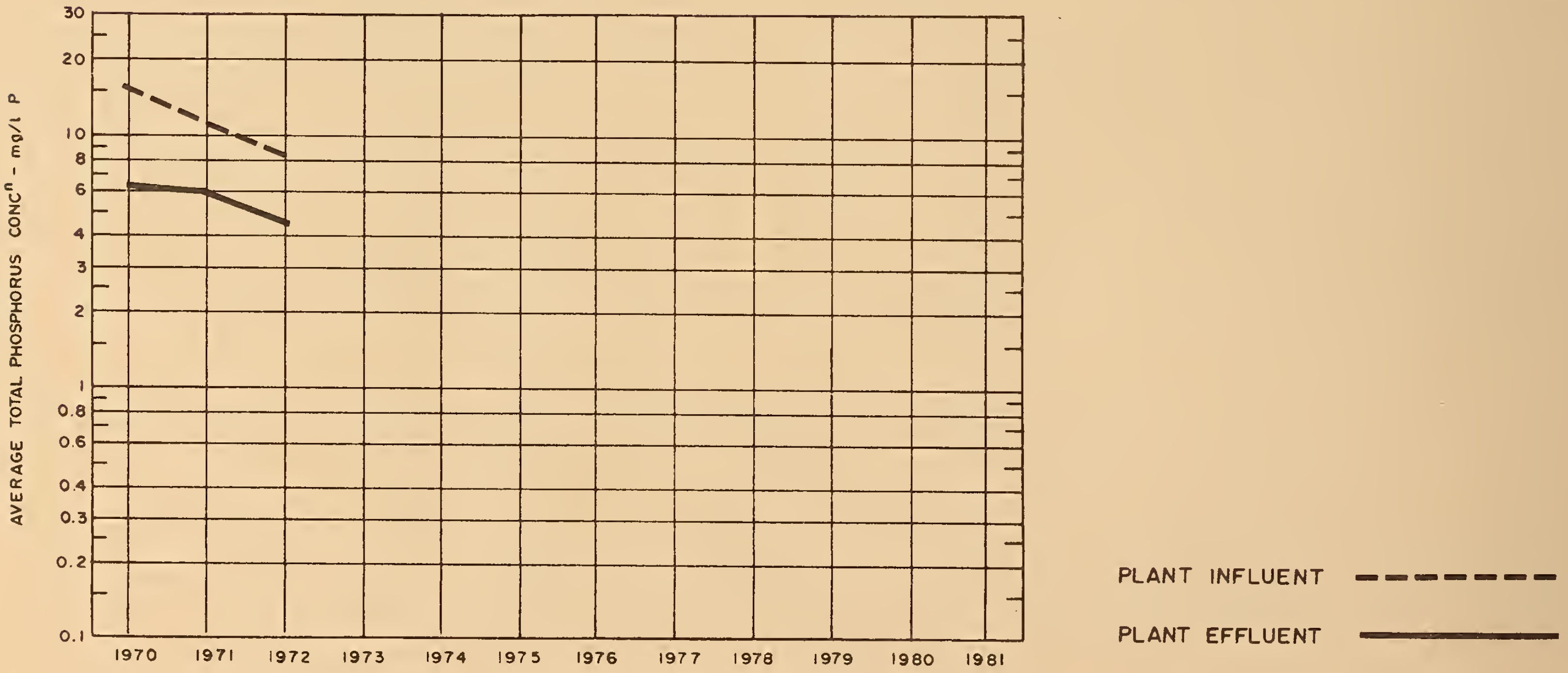
SUSPENDED SOLIDS



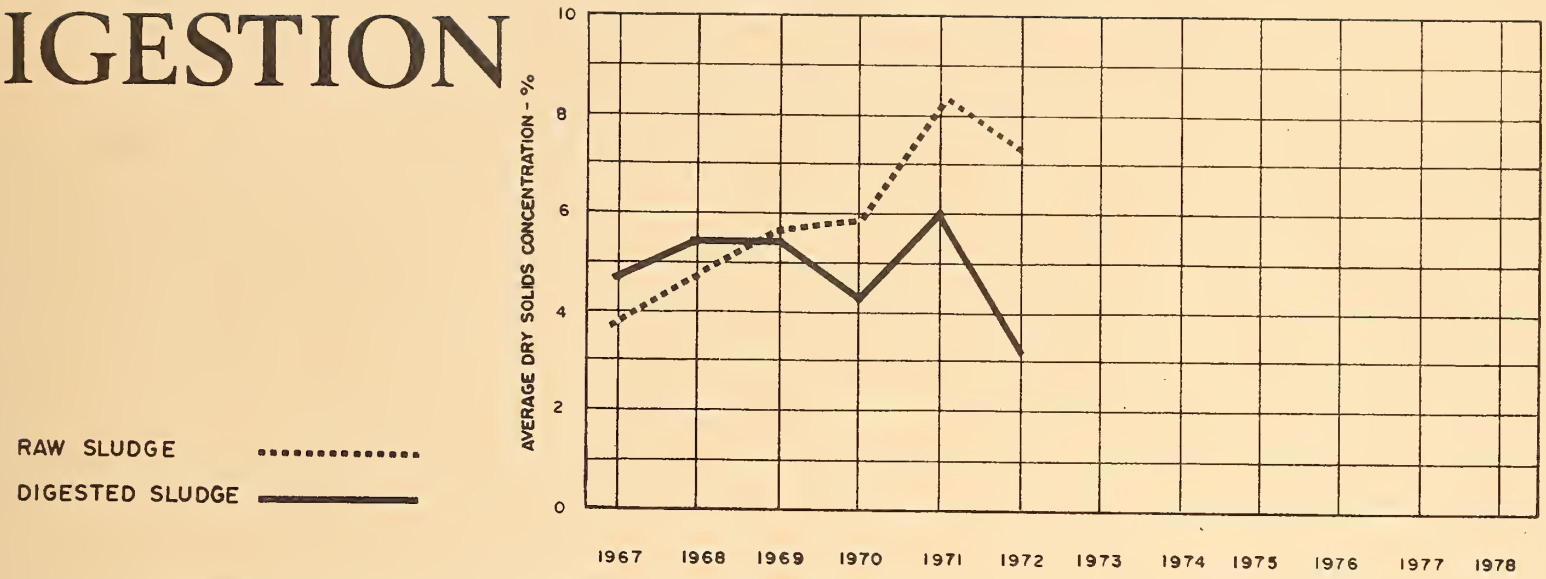


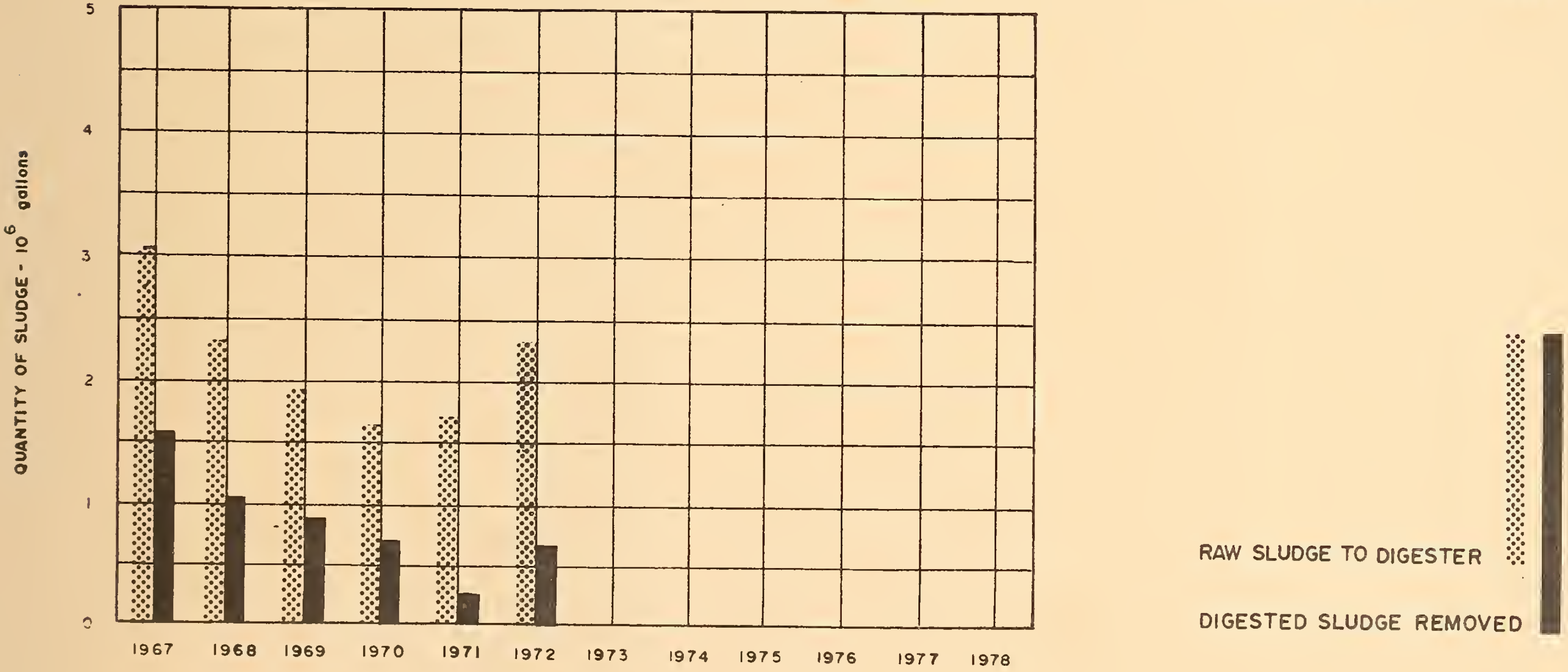
PHOSPHORUS


TOTAL PHOSPHORUS CONCⁿ – mg/l P
50
40
30
20
10
8
6
5
4
3
2
1
0.8
0.6
0.5
0.4
0.3
0.2
0.1
2
5
10
20
30
40
50
60
70
80
90
95
98
PERCENTAGE OF SAMPLES EQUAL TO, OR LESS THAN


AVERAGE TOTAL PHOSPHORUS CONCⁿ - mg/l P
30
20
10
8
6
4
3
2
1
0.8
0.6
0.4
0.3
0.2
0.1
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
PLANT INFLUENT
PLANT EFFLUENT

DIGESTION


RAW SLUDGE
DIGESTED SLUDGE
AVERAGE DRY SOLIDS CONCENTRATION - %
10
8
6
4
2
0
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978


QUANTITY OF SLUDGE - 10^6 gallons
5
4
3
2
1
0
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
RAW SLUDGE TO DIGESTER
DIGESTED SLUDGE REMOVED

TREATMENT DATA

MONTH	GRIT	CHLORINATION		PRIMARY EFFLUENT		AERATION			SLUDGE DIGESTION and DISPOSAL							
									RAW SLUDGE			DIGESTED SLUDGE			SUPER-NATANT	
	QUANTITY REMOVED cubic feet	Cl_2 USED pounds	AVG. DOSE mg/l	BOD mg/l	SUSPENDED SOLIDS mg/l	MLSS CONC mg/l	F/M day^{-1}	AIR $\frac{1000\ ft^3}{lb\ BOD}$	QUANTITY 10^5 gallons	TOTAL SOLIDS %	VOL. SOLIDS %	QUANTITY 10^5 gallons	TOTAL SOLIDS %	VOL. SOLIDS %	T. S. %	AMOUNT HAULED cubic yards
JAN	12			135	85	1700	.19	1.0	2.0	9.0	79	.26			.6	153
FEB	13			150	161	1800	.17	1.1	1.8	8.9	45	.44	3.5	63	.3	260
MAR	25			130	78	1600	.22	.9	2.4	8.2	80	.63	4.0	66	.2	376
APR	12			100	130	2000	.14	1.1	1.7	6.4	65	.19	1.0	68	.3	111
MAY	13	265	2.2	90	100	1700	.13	1.4	2.5	7.5	71	.34	.8	65	.3	204
JUNE	8	995		150	120	1800			2.4	9.8	69	.34			.2	205
JULY	16	1130		150	95	1500			2.8	10.0	56	.59	5.7	67		350
AUG	28	1394		80	110	1600			1.9			.47				278
SEPT	11	1248		130	130	1700			1.7	4.8	71	.56	4.0	63		334
OCT	12	562	2.1	130	100	2400	.13	1.0	1.5	4.7	70	.69	3.3	63		409
NOV	14				110	2400			1.3	5.2	56	.47				278
DEC	11			100	140	2500	.11	1.2	1.3			.75				445
TOTAL	175	5594	–	–	–	–	–	–	23.3	–	–	5.73	–	–	–	3403
AVG.	.2 cu.ft/mil gal	1118	2.2	122	113	1900	.16	1.1	1.9	7.4	66	.48	3.1	65	.3	284

Chlorination Period - May 23 to October 15.

Date Due

DEC

Ontario. Ministry of the Environment. Project Operations Branch.

Burlington-Drury Lane - Water Pollution Control Plant. 1972.

TD227/B87/D78/W38/1972/MOE

c.1 asgv

DATE	ISSUED TO
14.12.73	R. SADANA.

TD227/B87/D78/W38/1972/MOE
Ontario Ministry of the En
Burlington - Drury
Lane water pollution asgv
c.1 a aa

TD
367
.A56
B874
1972

Burlington ~ Drury Lane : wate
pollution control plant.
81583